

## SAFETY DATA SHEET

Version 6.5  
Revision Date 08/27/2022  
Print Date 02/15/2023

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifiers**

Product name : Ferrocene

Product Number : F408  
Brand : Aldrich  
CAS-No. : 102-54-5

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Identified uses : Laboratory chemicals, Synthesis of substances

**1.3 Details of the supplier of the safety data sheet**

Company : Sigma-Aldrich Inc.  
3050 SPRUCE ST  
ST. LOUIS MO 63103  
UNITED STATES

Telephone : +1 314 771-5765  
Fax : +1 800 325-5052

**1.4 Emergency telephone**

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-  
527-3887 CHEMTREC (International) 24  
Hours/day; 7 Days/week

**SECTION 2: Hazards identification****2.1 Classification of the substance or mixture****GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable solids (Category 1), H228  
Acute toxicity, Oral (Category 4), H302  
Acute toxicity, Inhalation (Category 4), H332  
Reproductive toxicity (Category 1B), H360  
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Liver, H373  
Short-term (acute) aquatic hazard (Category 2), H401  
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

**2.2 GHS Label elements, including precautionary statements**

Pictogram



|                            |                                                                                                                             |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Signal Word                | Danger                                                                                                                      |
| Hazard statement(s)        |                                                                                                                             |
| H228                       | Flammable solid.                                                                                                            |
| H302 + H332                | Harmful if swallowed or if inhaled.                                                                                         |
| H360                       | May damage fertility or the unborn child.                                                                                   |
| H373                       | May cause damage to organs (Liver) through prolonged or repeated exposure if inhaled.                                       |
| H401                       | Toxic to aquatic life.                                                                                                      |
| H410                       | Very toxic to aquatic life with long lasting effects.                                                                       |
| Precautionary statement(s) |                                                                                                                             |
| P201                       | Obtain special instructions before use.                                                                                     |
| P202                       | Do not handle until all safety precautions have been read and understood.                                                   |
| P210                       | Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.                                                         |
| P240                       | Ground/bond container and receiving equipment.                                                                              |
| P241                       | Use explosion-proof electrical/ ventilating/ lighting/ equipment.                                                           |
| P260                       | Do not breathe dust.                                                                                                        |
| P264                       | Wash skin thoroughly after handling.                                                                                        |
| P270                       | Do not eat, drink or smoke when using this product.                                                                         |
| P271                       | Use only outdoors or in a well-ventilated area.                                                                             |
| P273                       | Avoid release to the environment.                                                                                           |
| P280                       | Wear protective gloves/ protective clothing/ eye protection/ face protection.                                               |
| P301 + P312 + P330         | IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.                                                 |
| P304 + P340 + P312         | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell. |
| P308 + P313                | IF exposed or concerned: Get medical advice/ attention.                                                                     |
| P370 + P378                | In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.                                        |
| P391                       | Collect spillage.                                                                                                           |
| P405                       | Store locked up.                                                                                                            |
| P501                       | Dispose of contents/ container to an approved waste disposal plant.                                                         |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

|                  |                                                         |
|------------------|---------------------------------------------------------|
| Synonyms         | : Bis(cyclopentadienyl)iron<br>Di(cyclopentadienyl)iron |
| Formula          | : C <sub>10</sub> H <sub>10</sub> Fe                    |
| Molecular weight | : 186.03 g/mol                                          |
| CAS-No.          | : 102-54-5                                              |
| EC-No.           | : 203-039-3                                             |

| Component        | Classification              | Concentration |
|------------------|-----------------------------|---------------|
| <b>ferrocene</b> |                             |               |
|                  | Flam. Sol. 1; Acute Tox. 4; | <= 100 %      |

|  |                                                                                                                                                    |  |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | Repr. 1B; STOT RE 2;<br>Aquatic Acute 2; Aquatic<br>Chronic 1; H228, H302,<br>H332, H360, H373, H401,<br>H410<br>M-Factor - Aquatic<br>Chronic: 10 |  |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------|--|

For the full text of the H-Statements mentioned in this Section, see Section 16.

---

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

#### General advice

Show this material safety data sheet to the doctor in attendance.

#### If inhaled

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

#### In case of skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

#### In case of eye contact

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

#### If swallowed

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

### 4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed

No data available

---

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Water Foam Carbon dioxide (CO<sub>2</sub>) Dry powder

#### Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Carbon oxides

Iron oxides

Combustible.

Development of hazardous combustion gases or vapours possible in the event of fire.

### **5.3 Advice for firefighters**

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### **5.4 Further information**

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

---

## **SECTION 6: Accidental release measures**

### **6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.  
For personal protection see section 8.

### **6.2 Environmental precautions**

Do not let product enter drains. Risk of explosion.

### **6.3 Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### **6.4 Reference to other sections**

For disposal see section 13.

---

## **SECTION 7: Handling and storage**

### **7.1 Precautions for safe handling**

#### **Advice on safe handling**

Work under hood. Do not inhale substance/mixture.

#### **Advice on protection against fire and explosion**

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

#### **Hygiene measures**

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.  
For precautions see section 2.2.

### **7.2 Conditions for safe storage, including any incompatibilities**

#### **Storage conditions**

Tightly closed. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Heat sensitive.

#### **Storage class**

Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

### **7.3 Specific end use(s)**

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Ingredients with workplace control parameters

| Component | CAS-No.  | Value | Control parameters   | Basis                                                                                   |
|-----------|----------|-------|----------------------|-----------------------------------------------------------------------------------------|
| ferrocene | 102-54-5 | TWA   | 10 mg/m <sup>3</sup> | USA. ACGIH Threshold Limit Values (TLV)                                                 |
|           |          | TWA   | 5 mg/m <sup>3</sup>  | USA. NIOSH Recommended Exposure Limits                                                  |
|           |          | TWA   | 10 mg/m <sup>3</sup> | USA. NIOSH Recommended Exposure Limits                                                  |
|           |          | TWA   | 15 mg/m <sup>3</sup> | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants        |
|           |          | TWA   | 5 mg/m <sup>3</sup>  | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants        |
|           |          | PEL   | 10 mg/m <sup>3</sup> | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
|           |          | PEL   | 5 mg/m <sup>3</sup>  | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

### 8.2 Exposure controls

#### Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

#### Personal protective equipment

##### Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

##### Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: KCL 741 Dermatrill® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

Splash contact  
Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: 480 min  
Material tested: KCL 741 Dermatrill® L

### Body Protection

Flame retardant antistatic protective clothing.

### Respiratory protection

required when dusts are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

### Control of environmental exposure

Do not let product enter drains. Risk of explosion.

---

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

|                                                 |                                                                                                                |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| a) Appearance                                   | Form: crystalline<br>Color: orange                                                                             |
| b) Odor                                         | No data available                                                                                              |
| c) Odor Threshold                               | No data available                                                                                              |
| d) pH                                           | No data available                                                                                              |
| e) Melting point/freezing point                 | Melting point/range: 172 - 174 °C (342 - 345 °F) - lit.                                                        |
| f) Initial boiling point and boiling range      | 249 °C 480 °F - lit.                                                                                           |
| g) Flash point                                  | ( )No data available                                                                                           |
| h) Evaporation rate                             | No data available                                                                                              |
| i) Flammability (solid, gas)                    | The substance or mixture is a flammable solid with the category 1. - Regulation (EC) No. 440/2008, Annex, A.10 |
| j) Upper/lower flammability or explosive limits | No data available                                                                                              |
| k) Vapor pressure                               | < 0.1 hPa at 40 °C (104 °F)                                                                                    |
| l) Vapor density                                | No data available                                                                                              |
| m) Density                                      | 1.49 g/cm <sup>3</sup> at 20 °C (68 °F)                                                                        |
| Relative density                                | No data available                                                                                              |
| n) Water solubility                             | 0.0001 g/l at 20 °C (68 °F) - slightly soluble                                                                 |
| o) Partition coefficient: n-octanol/water       | log Pow: 3.711 at 22 °C (72 °F) - Bioaccumulation is not expected.                                             |
| p) Autoignition temperature                     | No data available                                                                                              |

- |                              |                   |
|------------------------------|-------------------|
| q) Decomposition temperature | No data available |
| r) Viscosity                 | No data available |
| s) Explosive properties      | No data available |
| t) Oxidizing properties      | none              |

## 9.2 Other safety information

No data available

---

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

### 10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

### 10.3 Possibility of hazardous reactions

Violent reactions possible with:  
perchlorates  
Strong oxidizing agents

### 10.4 Conditions to avoid

no information available

### 10.5 Incompatible materials

No data available

### 10.6 Hazardous decomposition products

In the event of fire: see section 5

---

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - Rat - 1,320 mg/kg

Remarks: (RTECS)

Inhalation: Harmful by inhalation.

LD50 Dermal - Rat - > 3,000 mg/kg

(OECD Test Guideline 402)

No data available

#### Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h

(OECD Test Guideline 404)

#### Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation - 72 h

Aldrich - F408

Page 7 of 10

(OECD Test Guideline 405)

**Respiratory or skin sensitization**

Maximization Test - Guinea pig

Result: Does not cause skin sensitization.

(OECD Test Guideline 406)

**Germ cell mutagenicity**

Test Type: gene mutation test

Test system: mouse lymphoma cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 476

Result: negative

Test Type: Micronucleus test

Species: Mouse

Method: Regulation (EC) No. 440/2008, Annex, B.12

Result: negative

**Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**Reproductive toxicity**

May damage the unborn child.

May damage fertility.

**Specific target organ toxicity - single exposure**

No data available

**Specific target organ toxicity - repeated exposure**

Inhalation - May cause damage to organs through prolonged or repeated exposure. - Liver

**Aspiration hazard**

No data available

**11.2 Additional Information**

RTECS: LK0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

---

**SECTION 12: Ecological information**

**12.1 Toxicity**

Aldrich - F408

Page 8 of 10

|                                                     |                                                                                                                 |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Toxicity to fish                                    | NOEC - <i>Leuciscus idus</i> (Golden orfe) - 20 mg/l - 48 h<br>(OECD Test Guideline 203)                        |
| Toxicity to daphnia and other aquatic invertebrates | EC50 - <i>Daphnia magna</i> (Water flea) - 1.17 mg/l - 48 h<br>(OECD Test Guideline 202)                        |
| Toxicity to algae                                   | static test EC50 - <i>Desmodesmus subspicatus</i> (green algae) - 1.03 mg/l - 72 h<br>(OECD Test Guideline 201) |
| Toxicity to bacteria                                | static test NOEC - <i>Pseudomonas putida</i> - > 87.6 mg/l - 6 h<br>Remarks: (ECHA)                             |

## 12.2 Persistence and degradability

Biodegradability      aerobic - Exposure time 41 d  
Result: 73 % - Inherently biodegradable.  
(OECD Test Guideline 301B)

## 12.3 Bioaccumulative potential

No bioaccumulation is to be expected ( $\log Pow \leq 4$ ).

## 12.4 Mobility in soil

No data available

## 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

## 12.6 Endocrine disrupting properties

No data available

## 12.7 Other adverse effects

No data available

---

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

#### Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

---

## SECTION 14: Transport information

### DOT (US)

UN number: 1325    Class: 4.1    Packing group: II  
Proper shipping name: Flammable solids, organic, n.o.s. (ferrocene)  
Reportable Quantity (RQ):  
Poison Inhalation Hazard: No

### IMDG

UN number: 1325    Class: 4.1    Packing group: II    EMS-No: F-A, S-G  
Proper shipping name: FLAMMABLE SOLID, ORGANIC, N.O.S. (ferrocene)

Marine pollutant : yes

**IATA**

UN number: 1325 Class: 4.1

Packing group: II

Proper shipping name: Flammable solid, organic, n.o.s. (ferrocene)

---

**SECTION 15: Regulatory information**

**SARA 302 Components**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 313 Components**

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

No components are subject to the Massachusetts Right to Know Act.

---

**SECTION 16: Other information**

**Further information**

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact [mlsbranding@sial.com](mailto:mlsbranding@sial.com).

Version: 6.5

Revision Date: 08/27/2022

Print Date: 02/15/2023